

into Afghanistan. By April 10, Cranes had completely disappeared.

Quail.—Return migration decidedly weak—local quail-catchers assert that the main body of the birds went north abnormally early this year.

Snipe and Duck.—Very much delayed. There were numerous flocks of duck and teal waiting for the April moon and a lot of snipe.

Stray teal seen in Kohat until April 27. One snipe seen; Kohat, April 30.

Snipe reported Bannu, April 25, fairly plentiful, information from Lt.-Col. W. P. Henry, P. A. V. O. Cavalry, Bannu—normally one expects to see the very last of the snipe at Parachinar—head of the Kurram river—about April the 1st. This year one may say the incidence of the hot weather in the North-West Frontier Province is at least a month late and the migration of birds appears to be correspondingly delayed.

KOHAT,
May 1, 1930.

G. DE LA P. BERESFORD,
Lt.-Col.,
Hodson's Horse.

XVI.—BIRDS OF A HIMALAYAN TORRENT. A STUDY IN BEHAVIOUR

The most delightful of Himalayan birds, those which everywhere meet the eye and which first attract attention by their plumage and behaviour, are the four inhabitants of the mountain streams. What splendid surroundings they have chosen for their habitat! A deep gorge is cut into the range. Its steep flanks are clothed in heavy vegetation. In its bed is a tempestuous torrent, roaring, splashing, leaping amongst boulders, sweeping in one place round bosses of rock, in another place swirling into frothy whirlpools, then for a space flowing smoothly, then rising into a cloud of foam as it breaks into rapids or cascades.

On and in the torrent live four birds. Every visitor to the Himalaya must see them. Their beauty and charm is evident enough: but in addition they give to the philosophical naturalist some material for question and thought.

These birds are—

The White-capped Redstart.—*Chaimarrhornis leucocephalus*.

The Plumbeous Redstart.—*Rhyacornis fuliginosa*.

The Himalayan Whistling Thrush.—*Myiophoneus temmincki*.

The Little Forktail.—*Microcichla scouleri*.

First a note on each of these. The White-capped Redstart is a gorgeous bird, with a black body, chestnut underneath, and a chestnut tail tipped with black. Most conspicuous, however is its white cap, vividly displayed in its flights amongst the stones. It loves to perch on boulders in the torrent, with the waters swirling round

about it, standing, as it were, on an island in the foam, bowing its head, jerking its tail, and displaying its striking colours to view. A less elegant bird is the Plumbeous Redstart. The male is a kind of leaden hue with a bright chestnut tail. The female is still plainer, a dull brown, and her tail, instead of being chestnut, possesses a large white patch. The Whistling Thrush is a much larger bird. From a distance it appears uniformly black, but, when seen at close quarters, it is cobalt blue. It loves to rest on the torrent boulders, but it also ascends the wooded slopes and frequents the side ravines. The Little Forktail is a fairy vision, an elusive display of black and white, that seems perfectly adapted to the water-washed stones. It loves the narrow gorge where the torrent is loudest or where it pours over in a steep cascade.

All these four birds frequent the boulders. All are certain to attract attention by the conspicuous movements of their tails.

COMPETITION IN THE TORRENT

Here we have four insect-eating birds. They all live in the same gorge: some or all of them may occupy the same stretch of torrent: all are on the same quest, the search for insects along the stream. Are the four birds competitors? Is each robbing the other of its food-supply; or can we see some special adjustment to suit the particular needs of each.

Careful observation will enlighten us on this point. Consider the habits of each species. The White-capped Redstart is a ground feeder. It uses the boulder as a kind of watch-tower from which to spy an insect on the ground. It captures insects of many kinds, all taken on the ground near the edge of the stream. The Plumbeous Redstart has another method. It has specialized in flycatcher activities. To it the boulder is a point of vantage from which to make skilful sallies in the air. At times it may take something from the moist stones, an insect that has been washed up by the torrent: but its pursuits are mainly aerial, and it does not compete with the white-capped species. The Whistling Thrush explores the flanks of the gorge. It is not as confined as the others to the torrent, but gets insects and molluscs on the wooded slopes and in the side ravines. The roughest spots along the torrent are the haunts of the Forktail. It likes the waterfalls and seething rapids. For its captures come from a different source, from minute insects washed into shallow water or tossed ashore by the turbulent stream. To get them it wades out on the water-washed boulders where the rushing torrent sweeps around its legs and envelops it in foam and spray. For the same reason it loves the waterfalls. There it gets many tiny morsels which the spouts of spray toss on to the stones.

Thus we observe that each species has its special way of securing food. All delight in the roar of the torrent; all are in pursuit of insects; all might be thought to be robbing one another of the morsels which abound along the stream. But we see that they are not strict competitors; it is better to regard their activities as interwoven, for each species in pursuit of prey lives its own

independent life. Each has its own area of search. The White-capped Redstart explores the ground; the Plumbeous Redstart makes sallies into the air: the Whistling Thrush searches the hill-sides; the Forktail examines the up-tossed spray. Thus, though all kinds do not strictly compete, yet no corner of the stream is left unsearched. This is a general principle in Nature. At first sight many creatures seem to be competitors, but careful observation discloses little differences. There is something in their habits or something in their structure which shows that they are equipped for different activities in the complex struggle of life.

FUNCTION OF THE TAIL

No one can observe these torrent birds without remarking on the striking manner in which they expand and oscillate their tails. It is a habit which they all possess to a greater or less degree. Flirting the tail is common amongst birds, but the species of the torrent exaggerate the action. For some reason, which we must investigate, this strikingly excessive movement of the tail is associated with torrent life.

Let us look closely at the behaviour. A White-capped Redstart alights on a boulder. Its tail expands, then oscillates vertically. We see a gorgeous chestnut-fan bordered by a black rim. The same thing happens with the Plumbeous Redstart. The male oscillates its chestnut feathers: the female shows flashes of white. Any slight movement on the part of the bird gives rise to this spreading and trembling of the tail. The Whistling Thrush too spreads its tail when it alights. But it is not the quick oscillating movement of the redstarts; it is more a slow deliberate depression of the tail combined with a spreading of the fan. The Little Forktail, while at rest, keeps its tail in motion, opening it and closing it, displaying its white edges which diverge like a trembling fork.

Now the question arises,—Why is all this? Why should tail-spreading and tail-oscillation be so highly developed in the birds of the stream? First, what is the function of a tail? We are inclined to regard the tail as a steering-organ for directing the aerial movements of the bird. And it may be to some slight extent. But it has other and more important functions. One of these is to act as a brake. Watch a crow alighting on a tree and see how its tail opens like a fan to check it as it comes to rest. A second important function, is an organ of balance. It helps to bring the bird into a state of equilibrium the very moment it alights. Take a wagtail by way of illustration. See the way in which the tail oscillates the instant the bird has alighted on the ground. For a second it moves up and down very rapidly: then the movement dies away as stability becomes secure. The oscillation clearly helps to bring stability and balance to the bird. A bird has to balance a bulky body on a pair of slender legs. The main portion of the load lies in front of the support, but the tail extended backwards is a counter-balance which helps to equalize the weight. Oscillating the tail will help the balance especially at times when stability is insecure. It is like a man trying to walk along a rope. The feat is difficult, but he can

make it more easy by carrying a balancing-rod across his body and oscillating it up and down.

Now, with these two ideas in mind, that the tail, by expanding, acts as a brake and by oscillating helps the balance, let us turn again to the torrent birds. Tail movement, as I have said, is very active amongst them. The tail is spread out like a fan and at the same time lowered and raised. The functions of brake and balance are combined. All this occurs at the moment of alighting. When equilibrium is restored, the action ceases. But the slightest movement, for instance if the bird changes its position or merely turns its head for an instant, is sufficient to disturb the equilibrium, with the result that the fan reopens and the oscillating function is resumed.

The question, of course, follows :—If the tail is a brake and a balancing organ, why should the birds of the torrent require it in so conspicuous a degree? Think for a moment of the habitat of these birds. Round about them are swirling waters. They live on boulders that project above the flood. The boulders are rounded, often slippery with moisture. The birds have to stand on them with outstretched claws, they cannot clutch them as they could the stems of trees. Their haunts are full of instability and insecurity, and the birds have nothing to grip. In such haunts they must maintain themselves by balance; hence the excessive movement of the tail.

For these birds are, in a sense, alien to this torrent life. By affinity they belong to tree-haunting groups, to birds which habitually grip stems rather than balance themselves on stones. The redstarts are allied to robins, which, of course, ordinarily perch on trees. The Little Forktail belongs to the same sub-family. The Whistling Thrush seems related to the babblers which skulk in bushes and scrub. The near relatives of these birds, therefore, live in vegetation and when they alight, they can clutch the stems in order to make their position secure. The torrent representatives have diverged from the family. They have found new haunts on slippery boulders. In their ancestors stability was secured by gripping; they must acquire it by means of balancing. Hence we see the organ of balance employed in this exaggerated way. Chats and robins, of course, do flirt the tail. It shows that they have to balance to some extent. What has happened is that the torrent representatives have had to develop the flirting function because they require it more.

Hence, when a torrent redstart alights, the tail opens, the fan expands. This checks the bird as it comes to the boulder and brings it to rest on the smooth stone. Then immediately the balancing-rod functions, the tail oscillates for a few moments, steadying the bird, securing its equilibrium until its stability of balance is attained.

Hence we have a simple mechanical explanation of the most delightful feature of these birds. The swaying of the tail, the spreading of the fan, the gorgeous view of chestnut in the White-capped Redstart, the snow-white flicker of the Little Forktail; these are the features that attract and delight us, yet they have, as

we see, a simple explanation; they are directly associated with equilibration and are necessary to secure the stability of the birds.

LONDON,
1929.

R. W. G. HINGSTON,
Major, I. M. S.

XVII.—BIRDS SEEN ON A TRIP FROM POTTUVIL TO KUMNA, CEYLON.

Between April 10 and April 21, 1929.

It may perhaps prove of interest in the future, to anyone who is interested in birds, if I place on record a list of the birds I saw on a trip from Pottuvil to Kumna, a distance of some thirty miles.

The trip lasted ten days, i. e., from April 10 to April 20, and was organized by Mr. George Crabbe, for the purpose of taking various fledglings of such birds as Pelicans, Ibis, Darters, etc., from that extremely interesting, but very little known lagoon, which is not far from the mouth of the Koombakan Oya.

The party consisted of Mr. George Crabbe, Mr. J. Morris Carey and myself, and a taxidermist from the Colombo Museum, who brought cages, etc., with him, for the reception of the fledglings.

The list below is a full list of the birds seen during the journey, and numbers some one hundred and five species. This is quite a fair number, but does not include all the possible species of birds that we might have seen.

Now as regards the Kumna Lagoon, which was our objective. This is a large sheet of brackish water, completely hidden from all view by its growth of mangroves. This mangrove swamp is from forty to fifty yards in depth, and had to be laboriously cut through before the raft which we had brought with us could be launched: and when launched, the raft had to be towed up by our trackers, through the path that they had cut into the swamp, as it was quite impossible to propel it through the mass of cut vegetation by means of a pole.

On emerging from the mangrove swamp into the open water of the lagoon, there was before us one of the strangest and finest sights that a person, keen on natural wild-bird life, could possibly wish to see. I use the word '*natural*' to imply that the birds which nest here have been completely undisturbed by mankind, and are therefore very tame, and can be approached quite close without showing a great deal of fear.

It was very interesting from the ornithologist's point of view to see how the birds which were nesting in this lagoon at the time of our visit, which was about the middle of April, had divided themselves up into roughly distinct zones.

The Spoonbills had all flown, and there were none nesting when we were there; the Ibises had practically all flown too, but there were several indications of where the bulk of the nests had been. The Egrets too, had nearly all flown.